Restoration, Acquisition, and Combination Project Proposal

Project Number	15-1192 R
Project Name	Salmon Creek - W. Uncas Road Bridge Construction
Sponsor	Jefferson County Public Works

List all related projects previously funded or reviewed by RCO:

Project # or Name	Status	Status of Prior Phase Deliverables and Relationship to Current Proposal?
14-1021 PLN	In progress	West Uncas Rd / Salmon Creek Culvert Design This is the design project for the current restoration/bridge construction funding request.

1. **Project Location.** *The project is located in Jefferson County approximately 10 miles south of Port Townsend near Discovery Bay. The culvert is located on Salmon Creek (RM 0.75) w~~W~~here it intersects with West Uncas Road (MP 0.804). Downstream waterbodies are the Snow & Salmon Creek Watersheds at the southern tip of Discovery Bay.*

2. **Brief Project Summary.** *Jefferson County Public Works proposes a restoration project that will remove a fish passage barrier along Salmon Creek (RM 0.75) where it intersects with West Uncas Road (MP 0.804) through the construction of an 80-84 ft. x 29 ft. concrete bridge to replace a 60 ft. long, 15.5 ft. x 9.5 ft. rise, corrugated steel pipe arch culvert.*

3. **Problems Statement.**

   A. **Describe the problem including the source and scale.** *The West Uncas Road culvert prevents the Salmon Creek Summer Chum's ability to access prime upstream spawning habitat. The culvert and riprap limit habitat forming processes that have the potential to negatively impact nearby salmon spawning habitat.*

   B. **List the fish resources present at the site and targeted by your project.**

Species	Life History Present (egg, juvenile, adult)	Current Population Trend (decline, stable, rising)	Endangered Species Act Coverage (Y/N)
Hood Canal Summer Chum	Egg, juvenile, adult	Stable	Y
Puget Sound Steelhead	Egg, juvenile, adult	Stable	Y
Straits Coho	Egg, juvenile, adult	Rising	N
Coastal Cutthroat	Egg, juvenile, adult	Rising	N

C. **Describe the limiting factors, and limiting life stages (by fish species) that your project expects to address.**
Removal of the West Uncas Road fish passage barrier is one of the final remaining salmon habitat improvement projects identified on Salmon Creek. Removal of the culvert will allow the Summer Chum to access prime spawning habitat. The bridge will completely eliminate the fish passage barrier and allow for the greatest increase in stream opening.

4. **Project Goals and Objectives.** *When answering the questions below please refer to Chapter 4 of the Washington Department of Fish and Wildlife's "Stream Habitat Restoration Guidelines" for more information on goals and objectives.*
   A. **What are your project's goals**?
   The Uncas Road culvert replacement project is expected to:
      - *Improve watershed continuity*
      - *Restore summer chum habitat*
      - *Improve spawning success of important salmon stock and*
      - *Improve fish access to high quality spawning and rearing habitat upstream of the culvert*

   B. **What are your project's objectives**?
   Remove one fish passage barrier along Salmon Creek (RM 0.75) where it intersects with West Uncas Road (MP 0.804) through the construction of an 80-84 ft. x 29 ft. concrete bridge to replace a 60 ft. long, 15.5 ft. x 9.5 ft. rise, and replant stream bank.

   C. **What are the assumptions and constraints that could impact whether you achieve your objectives?** *Jefferson County has identified $75,000 in match resources and is actively seeking the additional $50,000. Should the county be unable to locate the remaining funding, the project would be postponed until complete funding became available.*

5. **Project Details.**
   A. **Provide a narrative description of your proposed project.** *The design for this project was ~~Engineered plans (60% design for this project were~~ funded through a 2014 PIDA PSAR grant ~~and will be completed by the end of June.~~ The project will remove one fish passage barrier along Salmon Creek (RM 0.75) where it intersects with West Uncas Road (MP 0.804) through the construction of an 80-84 ft. x 29 ft. concrete bridge to replace a 60 ft. long, 15.5 ft. x 9.5 ft. rise. Approximately ~~3,490~~4,200 cy of fill will be removed and a ~~the~~ stream channel with a 24"-0" "bankfull width" will be reconstructed. The streambanks will be ~~hydroseeded and~~ replanted with native trees and the upper slopes hydroseeded to prevent erosion. This project will result in an additional 0.75 RM of prime upstream spawning habitat for Summer Chum.*

B. **Provide a scope of work.**
Jefferson County Department of Public Works (JCPW) will advertise construction and award to the lowest responsive bidder. JCPW will be onsite throughout construction. If adequate funding is realized, construction is projected to commence in late June of 2017 and be complete by October 1, 2017. All in water work would take place during the anticipated fish window of July 1 to August 31.
Task 1 – Existing Culvert Removal

1. *Stream bypass system and fish screens/fish exclusion process will commence.*
2. *Existing fill above/adjacent to existing culvert will be removed.*
3. *Existing culvert will be removed.*

Task 2 – Bridge Construction

1. *Bridge piles will be driven.*
2. *Streambed will be constructed per plans and specifications.*
3. *Bridge abutments, girders, deck, and guardrail will be constructed/installed.*
4. *Site restoration will be completed.*

C. **Explain how you determined your cost estimates**. *The estimates were created using standard engineering practices for determining project cost estimates.*

D. **Describe the design or acquisition alternatives that you considered to achieve your project's objectives.** *The 2014 PSAR grant application (Project #14-1021) proposed to replace the culvert with a ~~3-sided~~ concrete box culvert as previously proposed by WDFW. However, ~~due to the following issues~~ during the design process a bridge alternative was developed as a more appropriate alternative due to the following factors:~~.*

- *Amount of e~~E~~levation difference between the creek bed and the road surface*
- *The flow rate of the creek*
- *The subsurface soil types discovered during the geotechnical exploration*

Benefits of a bridge over a culvert are:

- *Completely eliminate the fish passage barrier.*
- *Provide the greatest increase in stream opening; debris passage would not be an issue.*
- *Provide the least construction impacts.*
- *~~Be nearly equivalent in cost to~~Not too significant of a cost increase over the originally proposed 3-sided box culvert alternative.*

E. **How have lessons learned from completed projects or monitoring studies informed your project**? *Jefferson County has removed and replaced many culverts over the years including fish passage barrier culverts. Each site presents its*

own challenges. Our Project Managers and contractors are experienced in addressing each site's specific constraints.

F. **Describe the long-term stewardship and maintenance obligations for the project or acquired land**. *This bridge will be added to the Jefferson County bridge inventory. It will be inspected and maintained along with all other county bridges.*

6. **Context within the Local Recovery Plan.**

A. **Discuss how this project fits within your regional recovery plan and/or local lead entity's strategy to restore or protect salmonid habitat**
Salmon Creek Summer Chum are at the top of Group 2 Stock Prioritization. Restoration of Salmon Creek is recommended in the Summer Chum Salmon Recovery Plan HCCC, 2005 and the culvert removal and bridge construction are part of a greater Salmon Creek rehabilitation project. (Refer to attached Watershed & Vicinity Map) The existing culvert blocks the Salmon Creek Summer Chum from accessing prime upstream spawning habitat.

B. **Explain why it is important to do this project now instead of later.**
During low flows in September 2008, when adult ESA-listed Hood Canal Summer Chum salmon were migrating into the system, the Uncas Road Culvert was found to be preventing the salmon's ability to access prime spawning areas upstream. WDFW and Jefferson County implemented emergency measures from 2009-2014 to create step pools with sandbags and temporarily backwater the culvert to facilitate summer chum passage. However, this was considered only a temporary solution to restoring fish passage and the permits expired last year. The culvert and the riprap armored reach just upstream also limit habitat forming processes that have the potential to negatively impact nearby salmon spawning habitat.

The Salmon Creek ESA-listed Hood Canal Summer Chum run is considered one of the most stable runs in the Hood Canal ESU. A supplementation program for Salmon Creek summer chum stock occurred from 1992-2003 using natal stock to increase the vitality of the existing summer chum run. This has proven successful as the escapement has increased from 215 fish in 1989 to 2,746 fish in 2013. However, as the numbers of adults have increased the proportion returning to use the upper range of their historic spawning grounds has also increased. With good fish passage 30-50% of the summer chum salmon will return to the upper spawning range (RM 0.75-1.5). The 2015 Salmon Creek Summer Chum run is currently in progress with the highest recorded count in recent history of 6,267 fish and counting.

C. **If your project is a part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which**

of these steps is included in this application for funding.
The Lead Entity for this project is the Hood Canal Coordinating Council (HCCC).

Restoration of Salmon Creek is recommended in the Summer Chum Salmon Recovery Plan HCCC, 2005. The Guidance for Prioritizing Salmonid Stocks, Issues, and Actions for the Hood Canal Coordinating Council, March 2015 identifies Salmon Creek Summer Chum are at the top of Group 2 Stock Prioritization. Table 3 Issues and action framework presents the following that will addressed by this project:

> *Freshwater Habitat: Access to instream habitats: The ability of juvenile and adult salmonids to swim upstream to access spawning grounds and rearing areas is vital to salmonid recovery and long-term sustainability. Poorly designed or deteriorating culvert and bridge installations, as well as other barriers to upstream passage, can block or impede passage of juvenile and/or adults.*
>
> *Freshwater Habitat: Sediment supply, transport, and storage: Erosion and sediment transport by rivers is one of the natural watershed processes that shape stream channels and floodplains, as well as associated habitats and aquatic biota, including salmonid populations. The sediment supply is produced from ongoing land erosion (e.g., landslides), as well as from the recapture of sediments (due to channel migration and avulsions) previously stored in flood plains and streambanks. Prior to the rapid alteration of watersheds by Euro-Americans, sediment transport from rivers was generally in equilibrium with sediment supply. Watershed alterations and management have disrupted the natural process, resulting in changes (often very significant ones) to the supply, storage, and transport of sediments.*

This project removes a fish barrier culvert and replaces the culvert with a bridge that will allow the juvenile and adult salmonids access to prime upstream habitat. The bridge will allow for more natural processes of the supply, storage and transport of sediments.

7. **Project Proponents and Partners.**

   A. **Describe your experience managing this type of project**. *Jefferson County has removed and replaced many culverts over the years including fish passage barrier culverts. Our Project Managers and C~~c~~ontractors are experienced in addressing each site's specific constraints.*

B. **List all landowner names**. *The bridge will be built within the West Uncas Road right-of-way owned by Jefferson County. The County intends to enter into temporary construction easements with the following:*
    - Crystal C. Bonney Estate: Patricia Bailey, Estate Representative
    - Wallace and Louise Bowman
    - Brenda McIntyre

C. **List project partners and their role and contribution to the project**.
Not applicable

D. **Stakeholder Outreach**. Eric Kuzma, Jefferson County Public Works Project Manager, has spoken to each adjacent property owner individually to garner their support. Their reaction has been positive to neutral.

Supplemental Questions

Restoration Project Supplemental Questions

Answer the following supplemental questions:

A. **Will you complete, or have you already completed, a preliminary design, final design, and design report (per Appendix D) before construction?**
Yes

B. **Will your project be designed by a licensed professional engineer?**
Yes

C. **If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery.**
Not applicable

D. **Describe the steps you will take to minimize the introduction and spread of invasive species during construction and restoration.**
Weed-free straw and hydro mulch will be used to stabilize disturbed soils thus preventing the spread of noxious weeds and other invasive plant species.

Fish Passage Project Supplemental Questions

Answer the following supplemental questions:

NOTE: For fish passage design and evaluation guidance, applicants should refer to the Washington Department of Fish and Wildlife's *Fish Passage Barrier and Surface Water Screening Assessment and Prioritization Manual*, and the *Design of Road Culverts for Fish Passage* manual. For prioritization questions or technical assistance, contact Susan Cierebiej, Department of Fish and Wildlife, (360) 902-2561. For engineering design questions or technical assistance, contact Don Ponder, Department of Fish and Wildlife, (360) 902-2547.

A. **Describe the passage problem (outfall, velocity, slope, etc.)**
Perched culvert

B. **Describe the current barrier (age, material, shape, and condition).**
Bridge was removed and c~~C~~ulvert was likely installed in the 1950's. Jefferson County documentation indicates the culvert was moved and extended in 1961.

C. **Is the current barrier a complete or partial barrier?**
Complete barrier for Summer Chum.

D. **If a culvert or arch is proposed, does it employ a stream simulation, no slope, hydraulic, or other design?**
A bridge is proposed which would completely eliminate~~s~~ the barrier.

E. **Describe the amount and quality of habitat made accessible if the barrier is corrected. Has the project received a Priority Index (PI) number?**
No PI number received.
Barrier identified in 2008.
Barrier evaluated in 2009 by Bob Barnard, WDFW engineer in his technical report that it was significant barrier to summer chum. (See attached Barnard Report 02-09-09.pdf)

F. **Identify if there are additional fish passage barriers downstream or upstream of this project.**
There are no barriers downstream of this project. Upstream at RM 2.0 there is cascade/falls which is presumed to be a barrier.

G. **Engineering licensing requirement. Will your project be designed by a licensed professional engineer?**
Yes

1. **If not, please describe the qualifications of your design team**.

Comments

Use this section to respond to the comments you will receive after your initial site visits, and then again after you submit your final application.

Response to Site Visit Comments

Please describe how you've responded to the review panel's initial site visit comments. *We recommend that you list each of the review panel's comments and questions and identify how you have responded. You also may use this space to respond directly to their comments.*

DRAFT APPLICATION / SITE VISIT REVIEW PANEL COMMENTS

Date: May 18, 2015 **Project Site Visit?** ☒ **Yes** ☐ **No**
Review Panel Member(s): Schlenger and Cramer

1. **Recommended improvements to make this a technically sound project according to the SRFB's criteria:**
   This project will remove the last remaining barrier in the Salmon Creek basin and is well sequenced with the Salmon Creek restoration projects downstream.

   The 100% draft design shows riparap placed under the bridge spanning the channel cross section and extending upstream and downstream beyond the bridge footprint. The bridge pile foundations will be driven below the anticipated scour depth and with riprap embankments and an armored channel bed. Longitudinal incision is not a concern though lateral channel migration does pose some concern. The recommended channel width between abutment protection is the bankfull width plus a factor of safety (*Water Crossing Design Guidelines, 2013*). The designed channel width is 30 feet as determined by the hydraulic analysis. Encroachment of abutment protection into the channel width as proposed is unacceptable; the width of unarmored channel must be at least 30 feet. The use of piles rather than spread footings typically do not neccessitate embankment and channel bed protection if the piles extend below the anticipated scour depth, which these piles do.

2. **Missing Pre-application information:**
3. **General Comments:**
4. **Staff Comments:**

The rip rap bank armor is not intended to protect the bridge foundation, which as noted consists of piling driven well below the streambed. The bank armor is intended to protect the earthen embankments supporting the road approaches to the bridge given the entry angle of the stream relative to the bridge crossing.

The stream entry angle concentrates significant scour energy first along the left bank and then deflects this energy into the downstream right bank during high flow events. The rip rap bank armor is designed to protect the earthen embankment at flows up to (and beyond) the 100-year design event and to prevent undermining of the road approaches due to lateral stream migration. (Two older bridges in Jefferson County have suffered embankment/road approach failures in recent years due to stream erosion. This has resulted in lengthy road closures and

costly retrofits with sheet pile retaining walls.) It is not feasible to (further) realign the stream or the roadway, at the crossing, given budget and adjacent private property constraints.

The existing steel culvert, combined with the salvaged WWII submarine netting, currently prevent embankment erosion. To restore fish passage this bridge project will remove these elements. Embankment protection needs to be addressed and is integral to the integrity of the design.

Additionally, the design incorporates 3 feet of native streambed material above the rip rap armoring. Since downward incision is not expected, the buried rip rap should have no impact on the channel. It is also over a very short length when compared to the overall channel length.

In order to address comments related to channel width, it may be possible to steepen the rip rap embankment angle from 2H:1V to 1.75H:1V without increasing the length of the bridge and driving up project costs. This would increase the channel width by 6 feet as addressed in the comments. An angle steeper than 1.75H:1V is not recommended.

As designed this project will permanently achieve the objective of fully restoring fish passage in this key watershed. Jefferson County Public Works staff welcomes the opportunity to coordinate a conference call between Ms. Cramer, Mr. Schlenger, and our engineering consultants to further discuss the review comments and more effectively address any remaining concerns.

Response to Post-Application Comments

Please describe how you've responded to the review panel's post-application comments. *We recommend that you list each of the review panel's comments and questions and identify how you have responded. You also may use this space to respond directly to their comments.*

Post-Application REVIEW PANEL comments

Date: 9/23/15 **Project Status:** POC

Review Panel Member(s): Full review panel

1. **If the project is a POC, identify the SRFB criteria used to determine the status of the project:** #11. The project design is not adequate or the project is sited improperly.

2. **If the project is a POC, identify the changes that would make this a technically sound project:** The review panel understands the design constraints at this particular site given limited ROW and the culvert skew and appreciates the modeling and design efforts put forth to improve fish passage and natural channel processes. Bridge span is the most fundamental parameter in bridge design for habitat protection. The recommended bridge span between armored

abutments should be greater than the OHW (WAC 220-110-070(1)a). The current design provides 20 feet between abutments rather than 24 ft, the bankfull width. It is not uncommon to place riprap on a 1.5:1 slope for bridge abutment and footing protection. Please revisit designing the side slopes for a 24 ft natural channel bed width. Perhaps the pile caps can be extended such that the height of riprap can be lowered to approximately the 100 year water surface depth? Or perhaps an ecology block or similar structure can be placed landward of the rock trench to reduce the slope. The review panel supports providing fish passage at this crossing and hopes the sponsor can eventually land on a design which will allow for natural channel bed variability without compromising the structural integrity of the abutments.

Since receiving the 5/18/15 'Site Visit Review Panel Comments' we have twice revised the design in an attempt to fully address them. The rip-rap bank armoring (revetment), located several feet below the reconstructed streambed material, was reconfigured in order to no longer span across the entire streambed cross section. A 15'-0" gap was initially provided and later increased to 20'-0" maintaining a 24'-0" Top of Bank Width. Page 25, Section 5.3, of the updated WSE Hydraulic Report, dated August 24th, further describes the development of these revisions.

The 9/23/15 'Post Application Review Panel Comments', which have been inserted above, indicate that these revisions did not fully address the Panel's concerns.

In response to the 9/23/15 comments, and so as to accommodate the entire 24'-0" bankfull width between the vertical faces of the rip-rap revetment, we now intend to further amend the bridge design. Further steepening of the revetment slope is not possible for those reasons also described in the above referenced updated WSE Hydraulic Report. There are two strategies we intend to consider. Neither dramatically modify the previously proposed structure, however at this time we estimate that both strategies could potentially increase the construction cost from 0-10%.

We propose to first prepare an analysis of the alternative strategies, as described below, and then select the option which cost effectively provides the greatest benefits.

Strategy One: Increase Bridge Span

The current design provides an 80-0" bridge span. With a maximum 1:1.75 revetment slope, this span allows for a maximum 20'-0" distance between the underlying vertical faces of the rip-rap revetment and a 24'-0" Top of Bank Width.

Although sensitivity to the concerns of adjacent landowners is necessary, we believe that increasing the bridge span to 84'-0" would be acceptable. We would again contact these landowners to discuss this possibility if it is determined to be the preferred solution.

The additional 4'-0" of bridge span would allow for an increased distance of 24'-0" between the underlying vertical faces of the rip-rap revetment and provide a 28'-0" Top of Bank Width. This

increase would also serve to decrease the elevation of the rip rap revetment relative to the streambed while maintaining the maximum 1:1.75 slope angle.

The additional 4'-0" of bridge span would however result in an increased bridge girder depth, potential (width) upsizing of the associated abutments, additional excavation quantities, etc.

Strategy Two: Increase Abutment Height

If we maintain the current 80'-0" bridge span, the desired 24'-0" distance between the underlying vertical faces of the rip-rap revetment could also be achieved through an increase in the height of the concrete bridge abutments.

An increased bridge abutment height would essentially serve as a taller retaining wall. With this increase we would be able to decrease the elevation of the rip rap revetment, and thereby increase the distance between the underlying vertical faces of the rip-rap revetment to 24'-0".

The increase in abutment height would require revising the abutment design. It would also require increasing the length of the associated bridge approach and the corresponding wing wall, or alternative system. The currently proposed wing wall design takes advantage of a cantilevered system for the sake of economy. As a result of the increased length a cantilevered system would no longer be feasible.

There are numerous means by which we could accommodate this revision, each with pros and cons which need further consideration. Some of these alternatives include:

1.) Increase the currently proposed wing wall length and install (a total of) four additional piles to provide support at each wing wall end.

2.) Construct a freestanding rather than cantilevered wing wall.

3.) Utilize a form of mechanically stabilized earth (MSE) system in lieu of wing walls. With this system there are numerous types of facing which would be evaluated.